

CLAIMS

1. A light sensor comprising: one or more light-emitting units for emitting light onto a target object; and one 5 or more light-receiving units for receiving reflection light from the target object;

wherein the one or more light-emitting units and the one or more light-receiving units are disposed such that a light emission axis of the one or more 10 light-emitting units and a light reception axis of the one or more light-receiving units are parallel or substantially parallel to each other.

2. The light sensor according to claim 1, further 15 comprising a light guide for regulating a path of at least one of light traveling toward the target object from the one or more light-emitting units and light traveling toward the one or more light-receiving units from the target object.

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3. The light sensor according to claim 2, wherein the light guide comprises: one or more first entrance areas for introducing light emitted from the one or more light-emitting units into the light guide; one or more 25 first output areas for outputting the light introduced into the light guide toward the target object; one or more second entrance areas for introducing reflection

light from the target object into the light guide; and
one or more second output areas for outputting the light
reflected by the target object and then introduced into
the light guide toward the one or more light-receiving
5 units; and

wherein at least one area of the one or more first
entrance areas, the one or more first output areas, the
one or more second entrance areas, and the one or more
second output areas refracts light passing through said
10 at least one area.

4. The light sensor according to claim 2, wherein the
light guide comprises a core portion extending along the
light emission axis, and an outer shell portion having
15 a lower refractive index than the core portion and
surrounding the core portion.

5. The light sensor according to claim 2, wherein the
light guide comprises an optical fiber portion extending
20 along the light emission axis, and an outer shell portion
surrounding the optical fiber portion.

6. The light sensor according to claim 2, further
comprising a light shield that causes light reflected
25 at a target angle by a target object, among the light
reflected by the test tool, to enter the one or more
light-receiving units selectively.

7. The light sensor according to claim 1, wherein the one or more light-emitting units comprise a single light-emitting unit, the one or more light-receiving units comprising a plurality of light-receiving units,

5 wherein the plurality of light-receiving units are arranged to surround the single light-emitting unit.

8. The light sensor according to claim 1, wherein the one or more light-emitting units comprise a plurality

10 of light-emitting units, the one or more light-receiving units comprising a single light-receiving unit,

 wherein the plurality of light-emitting units are arranged to surround the single light-receiving unit.

15 9. A light-measuring mechanism for a test tool, comprising: one or more light-emitting units for emitting light onto a test tool used for analyzing a sample; and one or more light-receiving units for receiving reflection light from the test tool;

20 wherein the one or more light-emitting units and the one or more light-receiving units are disposed such that a light emission axis of the one or more light-emitting units and a light reception axis of the one or more light-receiving units are parallel or

25 substantially parallel to each other.

10. The light-measuring mechanism for a test tool

according to claim 9, further comprising a light guide for regulating a path of at least one of light traveling toward the test tool from the one or more light-emitting units and light traveling toward the one or more 5 light-receiving units from the test tool.

11. The light-measuring mechanism for a test tool according to claim 10, wherein the light guide comprises: one or more first entrance areas for introducing light 10 emitted from the one or more light-emitting units into the light guide; one or more first output areas for outputting the light introduced into the light guide toward the target object; one or more second entrance areas for introducing reflection light from the target 15 object into the light guide; and one or more second output areas for outputting the light reflected by the target object and then introduced into the light guide toward the one or more light-receiving units; and

wherein at least one area of the one or more first 20 entrance areas, the one or more first output areas, the one or more second entrance areas, and the one or more second output areas refracts light passing through said at least one area.

25 12. The light-measuring mechanism for a test tool according to claim 10, wherein the light guide comprises a lens or a prism.

13. The light-measuring mechanism for a test tool according to claim 11, wherein the one or more first output areas and the one or more second entrance areas are constituted as planar surfaces that are orthogonal or 5 substantially orthogonal to the light emission axis of the one or more light-emitting units.

14. The light-measuring mechanism for a test tool according to claim 10, wherein the light guide comprises 10 a core portion extending along the light emission axis, and an outer shell portion having a lower refractive index than the core portion and surrounding the core portion.

15. The light-measuring mechanism for a test tool 15 according to claim 14, wherein the outer shell portion functions as a cladding layer, and wherein the light guide as a whole constitutes an optical fiber.

20 16. The light-measuring mechanism for a test tool according to claim 10, wherein the light guide comprises an optical fiber portion extending along the light emission axis, and an outer shell portion surrounding the optical fiber portion.

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17. The light-measuring mechanism for a test tool according to claim 11, further comprising a light shield

for causing light reflected by the test tool at a target angle, among the light reflected by the test tool, to enter the one or more light-receiving units selectively.

5 18. The light-measuring mechanism for a test tool according to claim 17, wherein the target angle is 45 degrees or substantially 45 degrees.

10 19. The light-measuring mechanism for a test tool according to claim 17, wherein the light shield is formed with an opening for selectively exposing the one or more first output areas and the one or more second entrance areas.

15 20. The light-measuring mechanism for a test tool according to claim 17, wherein the light shield comprises an annular part surrounding a periphery of at least one of the one or more first output areas and the one or more second entrance areas.

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21. The light-measuring mechanism for a test tool according to claim 17, wherein the one or more first output areas or the one or more second entrance areas of the light guide comprise a plurality of first output areas or a plurality of second entrance areas, and wherein the light shield is formed with an opening for exposing the plurality of first output areas or the

plurality of second entrance areas in succession.

22. The light-measuring mechanism for a test tool according to claim 9, wherein the one or more 5 light-emitting units comprises a single light-emitting unit, the one or more light-receiving units comprising a plurality of light-receiving units, and wherein the plurality of light-receiving units is arranged to surround the single light-emitting unit.

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23. The light-measuring mechanism for a test tool according to claim 9, wherein the one or more light-emitting units comprise a plurality of light-emitting units, the one or more light-receiving 15 units comprise a single light-receiving unit, and wherein the plurality of light-emitting units is arranged to surround the single light-receiving unit.

24. The light-measuring mechanism for a test tool 20 according to claim 23, wherein the plurality of light-emitting units comprise two or more light-emitting units which emit light having different peak wavelengths.

25. The light-measuring mechanism for a test tool 25 according to claim 9, wherein the light-receiving unit is constituted to receive scattered light reflected by the test tool among the light emitted by the

light-emitting unit.

26. The light-measuring mechanism for a test tool according to claim 9, further comprising one or more 5 wavelength selection portions for causing light reflected by the test tool to enter the one or more light-receiving units after selection of a wavelength.

27. The light-measuring mechanism for a test tool 10 according to claim 9, further comprising one or more wavelength selection portions for outputting light emitted from the one or more light-emitting units toward the test tool after selection of a wavelength.

15 28. A detecting mechanism of a test tool for detecting whether or not a test tool exists in a target area, comprising: a light-emitting unit for emitting light toward the target area; and a light-receiving unit for receiving reflection light from the test tool; 20 wherein the light-receiving unit is constituted to receive light that is reflected regularly by the test tool selectively, among the light emitted by the light-emitting unit.

25 29. The detecting mechanism of a test tool according to claim 28, further comprising a light guide for regulating a path of at least one of light traveling toward the target

area from the light-emitting unit and light traveling toward the light-receiving unit from the target area.

30. The detecting mechanism of a test tool according to
5 claim 29, wherein the light guide comprises: a first entrance area for introducing light emitted from the light-emitting unit into the light guide; a first output area for outputting the light introduced into the light guide toward the target area; a second entrance area for
10 introducing reflection light from the test tool into the light guide; and a second output area for outputting the light reflected by the test tool and then introduced into the light guide toward the light-receiving unit;

wherein at least one area of the first entrance area, the first output area, the second entrance area, and the second output area is arranged to refract light passing through said at least one area.

31. The detecting mechanism of a test tool according to
20 claim 29, wherein the light guide comprises a prism or a lens.

32. The detecting mechanism of a test tool according to
claim 29, wherein the light guide comprises a cylindrical
25 lens or a Fresnel lens.

33. The detecting mechanism of a test tool according to

claim 29, wherein the light guide comprises: a lens having an irregular surface; and a cover that covers the irregular surface and makes an upper surface of the light guide flat.

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34. The detecting mechanism of a test tool according to claim 33, wherein the light guide comprises a Fresnel lens.

10 35. The detecting mechanism of a test tool according to claim 29, wherein the light-emitting unit comprises a light-emitting diode.

15 36. The detecting mechanism of a test tool according to claim 29, wherein the light-emitting unit and the light-receiving unit are disposed such that a light emission axis of the light-emitting unit and a light reception axis of the light-receiving unit are parallel or substantially parallel to each other.

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37. A detecting mechanism of a test tool for detecting whether or not a test tool exists in a target area, comprising: a light-emitting unit for emitting light toward the target area; and a light-receiving unit for receiving reflection light from the test tool;
wherein at least one of light traveling toward the target area from the light-emitting unit and light

traveling toward the light-receiving unit from the target area is refracted.

38. The detecting mechanism of a test tool according to
5 claim 37, further comprising a light guide for regulating a path of at least one of the light traveling toward the target area from the light-emitting unit and the light traveling toward the light-receiving unit from the target area.

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39. The detecting mechanism of a test tool according to claim 38, wherein the light guide comprises: a first entrance area for introducing light emitted from the light-emitting unit into the light guide; a first output area for outputting the light introduced into the light guide toward the target area; a second entrance area for introducing reflection light from the test tool into the light guide; and a second output area for outputting the light reflected by the test tool and then introduced into 15 the light guide toward the light-receiving unit;

20 wherein at least one area of the first entrance area, the first output area, the second entrance area, and the second output area is arranged to refract light passing through said one area.

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40. The detecting mechanism of a test tool according to claim 38, wherein the light guide comprises a prism or

a lens.

41. An analyzing device comprising:

5 a light-measuring mechanism including one or more light-emitting units for emitting light onto a test tool used for analyzing a sample, and one or more light-receiving units for receiving reflection light from the test tool; and

10 a detecting mechanism including a light-emitting unit for emitting light onto the test tool to detect whether or not the test tool exists in a target area, and a light-receiving unit for receiving reflection light from the test tool;

15 wherein the one or more light-emitting units and the one or more light-receiving units of the light-measuring mechanism are disposed such that a light emission axis of the one or more light-emitting units and a light reception axis of the one or more light-receiving units are parallel or substantially 20 parallel to each other, and

25 wherein the light-receiving unit of the detecting mechanism is arranged to receive light that is reflected regularly by the test tool selectively, among the light emitted by the light-emitting unit of the detecting mechanism.